Limits of Discontinuous Functions name_____

1) $\lim_{x\to 4}\frac{x^2-16}{x-4} = \lim_{x\to 4} x+4 = 8$

2) $\lim_{x\to 2}\frac{2x^2-4x}{x^2-4} = \lim_{x\to 2}\frac{2x}{x+2} = 1$

3) $\lim_{x\to 1}\frac{\frac{1}{x}-x}{\frac{1}{x}-1} = \frac{\frac{1-x^2}{x}}{\frac{1-x}{x}} = \frac{1-x^2}{1-x} = \frac{-1(x^2-1)}{-1(x-1)} = \frac{(x+1)(x-1)}{x-1} = x+1 = 2$

4) $\lim_{x\to 1}\frac{x^2-6x+5}{x-1} = \lim_{x\to 1}\frac{(x-5)(x-1)}{(x-1)} = x-5 = -4$

5) $\lim_{x\to 5}\frac{\frac{1}{x}-\frac{1}{5}}{x-5} = \frac{\frac{5-x}{5x}}{x-5} = \frac{\frac{-1(x-5)}{5x}}{x-5} = \frac{-1}{5x} = \boxed{\frac{-1}{25}}$

6) $\lim_{x\to 2}\frac{x^2-6x+5}{x-1} = \frac{4-12+5}{1} = -3$

(continuous)

Limits of Discontinuous Functions name_____

7) $\lim_{x\to 3}\frac{4x^2-12x}{x^2-9} = \frac{4x(x-3)}{(x-3)(x+3)} = \frac{4x}{x+3} = 2$

8) $\lim_{x\to 6}\frac{2x-12}{x^2-x-30} = \frac{2(x-6)}{(x-6)(x+5)} = \frac{2}{x+5} = \frac{2}{11}$

9) $\lim_{x\to 1}\frac{\frac{1}{x}-1}{x-1} = \frac{\frac{1-x}{x}}{x-1} = \frac{-1(x-1)}{x}\cdot\frac{1}{x-1} = \frac{-1}{x} = -1$

10) $\lim_{x\to 2}\frac{\frac{1}{2}-\frac{1}{x}}{x-2} = \frac{\frac{x-2}{2x}}{x-2} = \frac{1}{2x} = \frac{1}{4}$

11) $\lim_{x\to 5}\frac{x^2-6x+5}{x-5}$ $\frac{(x-1)(x-5)}{x-5} = x-1 = 4$

12) $\lim_{x\to 5}\frac{\frac{1}{3}-\frac{1}{x}}{x-3}$ $\frac{\frac{x-3}{3x}}{x-3} = \frac{1}{3x} = \frac{1}{15}$